THE SCIENCE OF SURVIVAL

ACR ELECTRONICS

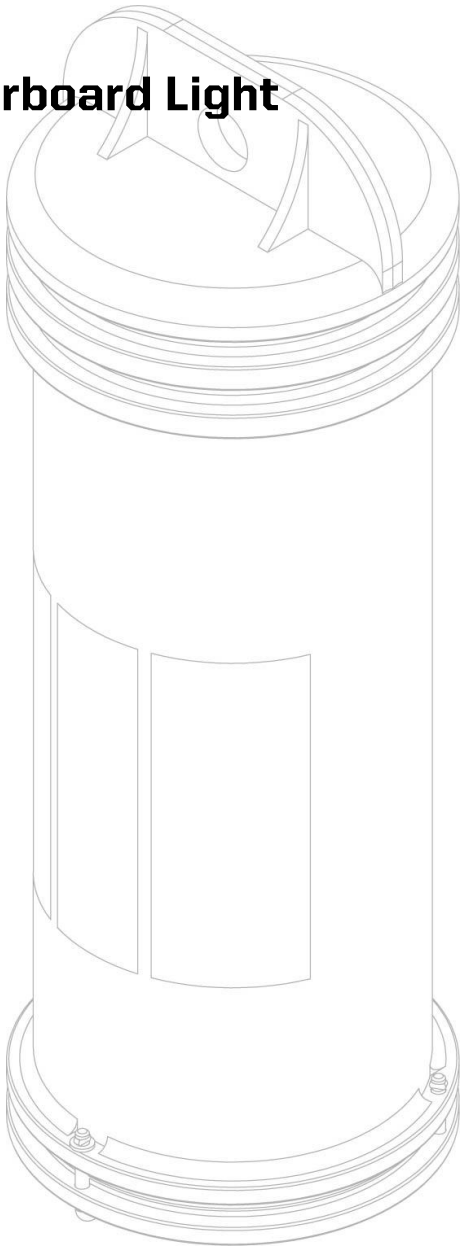
COBHAM

**PRODUCT SUPPORT MANUAL**

# SM-2
# Automatic Crew-Overboard Light

**Product No.: 3940.1**

**Y1-03-0165 Rev. D**



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**IF YOU HAVE ANY TROUBLE WITH YOUR NEW LIGHT, DO NOT RETURN IT TO THE STORE! CALL ACR ELECTRONICS AT +1 (954) 981-3333. WE WILL HELP YOU RESOLVE ANY PROBLEMS YOU MAY BE EXPERIENCING. MANY QUESTIONS CAN BE ANSWERED OVER THE PHONE.**

**LIMITED WARRANTY**

**This product is warranted against factory defect in material and workmanship for a period of one year from date of purchase or receipt as a gift. During the warranty period ACR Electronics, Inc. will, at its option, repair or replace the unit at no cost to you for labor, materials or return transportation. For further assistance please contact our Technical Service Department at ACR Electronics, Inc., 5757 Ravenswood Road, Fort Lauderdale, FL 33312-6645. Email: service@acrelectronics.com, Fax: +1 (954) 983-5087, Telephone: +1 (954) 981-3333**

**This warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification by other than the factory. Except as otherwise expressly stated above, the COMPANY MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO THIS PRODUCT. The Company shall not be liable for consequential or special damages.**

**In order to place the warranty in effect, the accompanying registration card must be returned to us within ten days of purchase.**

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**PLEASE READ ALL WARNINGS, CAUTIONS AND NOTES CAREFULLY**

**CAUTION: In order for the marker light to float properly, the 6 volt battery MUST not weigh more than 675 grams (1.49 lbs). Exceeding this weight will cause the light to sink.**




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**FOREWORD**

We design, manufacture and distribute quality products knowing they are used to save lives. Many of our products are required to be tested and approved by regulatory bodies worldwide. We believe in going beyond those specifications to insure our products work when needed in real world conditions. With proper care and maintenance your ACR product will last for years. It is important that you thoroughly read this product support manual to understand the proper care and use of your ACR product.

ACR is proud to be certified to ISO 9001: 2000, the International Standard for Quality.

Test light buoyancy in shallow water prior to placing in service.

The following battery types are suggested for use in ACR Marker lights:

Suggested Screw Terminal batteries:

| BRAND | MODEL NUMBER |
|---|---|
| ANSI/NEDA: | 915, 915C, 915D, 915AC |
| Duracell: | M915, PC915 |
| Rayovac: | 942, 945 |
| Eveready: | 510S |

Suggested spring terminal batteries (for use with optional battery adapter 9434):

| BRAND | MODEL NUMBER |
|---|---|
| ANSI/NEDA: | 908, 908C, 908D, 908AC |
| Duracell: | M908, PC908 |
| Eveready: | 509, 1209 |
| Energizer: | EN529, (*not 529*) |
| Rayovac: | 941, 944 |
| Panasonic: | W-4FD |

**NOTE:** Check adapter to ensure that screws are tight during regular maintenance.

**SECTION 1 - INSTALLATION**

**1.1 Installation Procedure**

The installation procedure requires that the mounting bracket be securely fastened in any convenient location that would provide immediate access in the event of an emergency.

Suitable length ¼ - 20 stainless screws should be used for mounting the bracket. Screw heads should not protrude inside the bracket surface.

**1.2 Battery Installation**

The SM-2 is normally shipped from the factory without a battery. Follow disassembly instructions in Section 2 of this manual for battery installation. The SM-2 uses a standard 6 volt lantern type battery with screw terminals. A list of recommended batteries can be found above. **Note maximum allowable battery weight listed in Section 3.12.**

**SECTION 2 - MAINTENANCE**

**2.1 Operation**

The unit should be tested monthly. Remove the SM-2 from its bracket and invert it. The unit should begin flashing, at a rate of about one flash per second. Re-invert the unit after confirming correct operation.

**2.2 Inspection**

Check the exterior of the unit for damage which might affect proper operation (damage to globe, cracks in case, etc.). Check bracket security.



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## 2.3 Disassembly

This will ordinarily be required only if testing shows that the light is malfunctioning, or if battery replacement is required. Recommended interval for battery replacement is one year.

A. Hold the unit on a flat, firm surface, lens side up. Depress the top cap of the unit, by pushing straight down on the top cap assembly, until the swivel locks may be turned outward, clear of the cap.

B. Grip the light lens (using a clean cloth or gloves for a better grip on the smooth surface and to avoid marring the lens surface) and pull upwards until the top cap is clear of the case.

C. Turn the unit on its side, open end slightly downwards, to allow the foam filler and battery to slide out.

D. Disconnect the battery by unscrewing the terminals from the battery posts.

E. Replace the strobe module, if required, as follows:

   a. Remove foam filler from strobe module, by sliding it off.

   b. Slip foam spacer over new strobe module to seat in cap recess.

   c. Inspect O-Ring seal for proper fit. Lubricate with silicone grease.

F. Replace the battery by securing the two terminals to the battery posts. Assure tightness.

**NOTE:** Connect black lead to center (-) post of battery. Connect red lead to outer (+) post of battery.

G. Check for proper operation by holding the top cap assembly vertical (light lens up). The unit should flash about once each second. If the unit does not operate, check for proper battery connection.

## 2.4 Assembly

A. Hold the case horizontally and slide the battery in, terminal end up (towards the open end of the case).

B. Lubricate the top cap O-ring with silicone grease and insert the cap and foam spacer into the case.

C. Place the unit upright on a firm surface, and press the top cap assembly until the cap slips into the case.

D. Depress the cap until the locking swivels can seat into the provided recesses.

E. Turn the locking swivels, seat them into the cap recesses and remove pressure from the top to allow it to move upwards and lock.

F. Check unit operation.

**CAUTION:** Assure that the locking swivels are properly seated in the cap grooves. Rotate the cap, if necessary, to assure proper seating of the swivels.



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## 2.5 SM-2 Parts List

**NOTE:** Item numbers refer to Figure 1 on next page.

| ITEM | DESCRIPTION | PART NUMBER |
|---|---|---|
| 1 | Case Assembly | A3-06-2295 |
| *2 | Case (*not shown*) | A1-18-1878 |
| *3 | Washer, 3 each (*not shown*) | A1-05-0659-3 |
| *4 | Locking Swivel, 3 each (*not shown*) | A1-17-1283 |
| 5 | Battery Pad, Foam | A1-18-0773 |
| 6 | Battery, 6 Volt Lantern Type (see page 4 for recommended batteries) (*not shown*) | Not Included |
| 7 | Foam Filler | A1-18-1877 |
| 8 | O-Ring (Top Cap) | A1-05-0001-64 |
| 9 | Top Cap and Lens Tube Assembly | 9021.1 |
| 10 | Mounting Bracket | 9438.1 |
| 11 | Stainless Steel Bracket (*Sold separately*) (*not shown*) | 9566 |
| 12 | 6VST Battery Adapter (*Sold separately*) (*not shown*) | 9434 |
| **** Included with Item 1*** | | |

## 2.6 Accessories

| DESCRIPTION | PART NUMBER |
|---|---|
| Repair Kit (contains 3 retaining rings and locking swivels, 1 O-ring and 1 manual | 9286 |
| 4D6VSP Battery adapter | 9398 |



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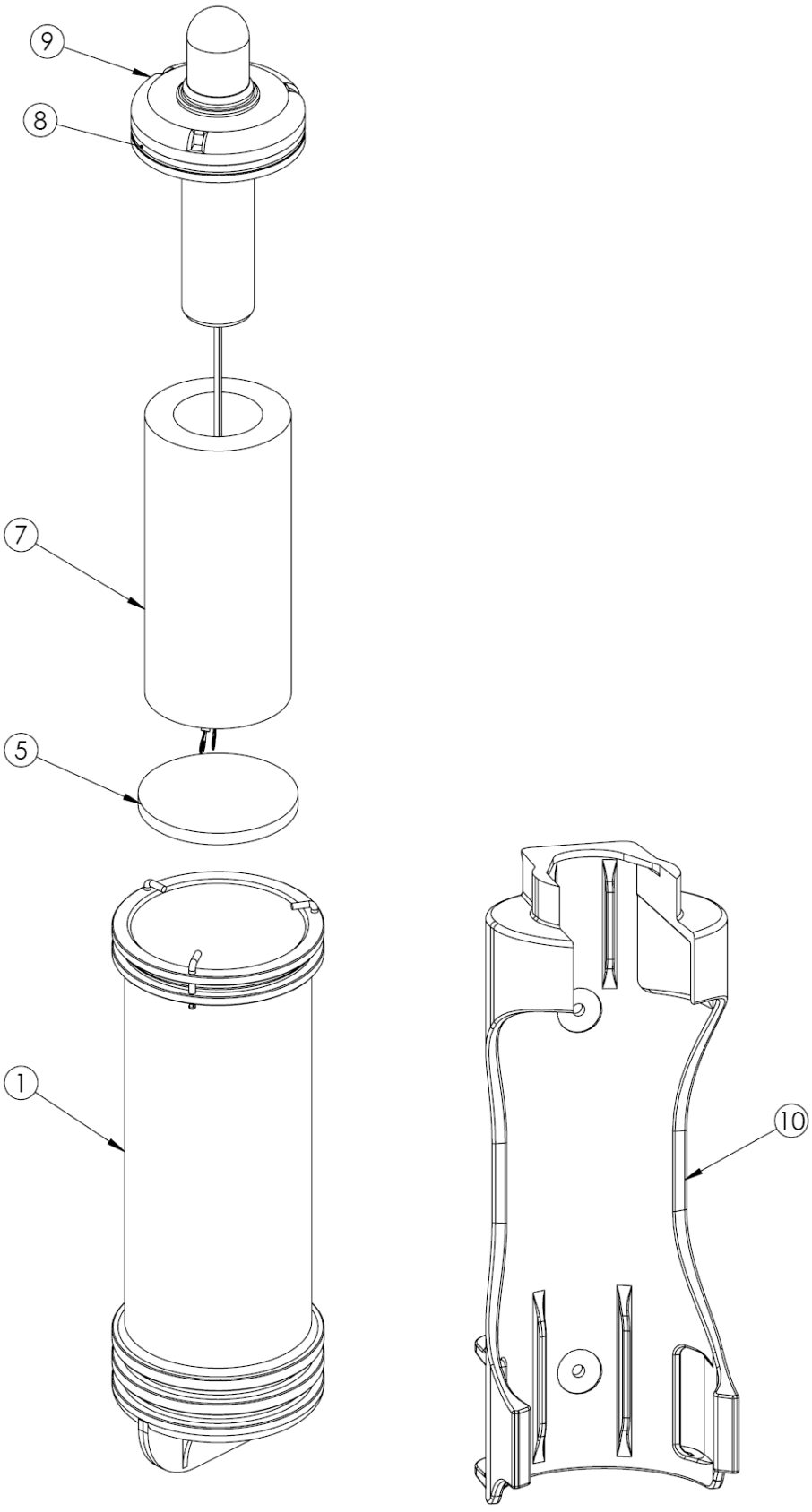


**FIGURE 1**
**EXPLODED VIEW SM-2**



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## SECTION 3 - CHARACTERISTICS

### 3.1 General

This section describes operating instructions and operational characteristics of the SM-2 Automatic Crew-Overboard Light. The information presented is in conformance with U.S. Coast Guard Specification 46 CFR 161.010 and 161.110.

The SM-2 is a lightweight, compact, battery operated, portable unit which uses modular construction for basic circuits to simplify maintenance and replacement procedures.

The SM-2 has been designed and tested to pass the tough ANSI/UL 1196 and MSC.81(70) requirements.

### 3.2 Purpose

This unit is a portable electronic floating strobe light which automatically rights itself and begins flashing when dropped into water. The SM-2 is designed to be carried aboard all vessels, as well as artificial islands and fixed structures. It is to be used as part of the required survival equipment complement. The light is used to mark a position in the water, particularly in a crew-overboard situation. It must be installed and used in conjunction with other equipment as required by U.S. Coast Guard Regulations.

### 3.3 Component Ratings

Circuit design and component selection is such that component ratings cannot be exceeded when the unit is operated throughout the entire range of all environmental tests. The SM-2 uses circuit components and construction techniques, which have been manufactured to the specifications and requirements of various civilian and Governmental agencies.

### 3.4 Operation

Instructions for operation and maintenance of the SM-2 are given on the instruction plate (see Figure 3). This unit does not possess any exterior operating controls. The circuit is electronically activated by a gravity switch when the unit is inverted.

### 3.5 Construction

The SM-2 consists of a case with a battery, switch, electric circuit, flashlamp, globe, lanyard attachment flange, mounting bracket, and a buoyant, non-absorbent unicellular polyfoam, used as filler material. The case is made of high-impact plastic, International Orange in color, which is constructed to receive all components necessary to produce the required light output. No additional signaling devices are incorporated in the unit. The lens is designed to withstand all impact tests that are required in this application. The watertight integrity of the equipment is assured by O-Ring seals between surfaces. The unit's ability to withstand any anticipated external forces is assured by the combination of material strength and assembly methods. Ballast consists of a metallic weight permanently secured in the bottom of the case. The case and related compounds do not flow at temperatures below +85°C or crack at temperatures down to -34°C.

### 3.6 Lanyard

The size, weight, and shape of the light are suitable for conveniently throwing overboard while attached to a life ring buoy by means of a lanyard. A hole is provided in the bottom flange of the case for lanyard attachment.

### 3.7 Mounting Bracket

The mounting bracket is designed to hold the light in the inverted position and prevent free movement of the light when properly secured within the bracket. The bracket is made of a corrosion-resistant plastic and is arranged for mounting on a vertical surface.

### 3.8 Dimensional Stability

The SM-2 is capable of undergoing specified temperature humidity cycles with no signs of shrinkage or distortion which might impair its serviceability or watertightness.



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### 3.9 Stroboscopic Flashing Light

The SM-2 Flashing Light uses a capacitor discharge xenon flashtube and meets the following requirements:

A. A completely sealed solid state circuit converts power from the battery and supplies it to the flashtube.

B. A suitable capacitor discharge xenon flashtube is provided which is compatible with the electronic flashing circuit and lens to provide the required light output. The service life of this flashtube is rated for over 1,000,000 flashes.

C. The light will flash at a rate of 60 ± 1 flashes per minute with a minimum intensity of 2 cd for a minimum of 15 hours. Light from each flash is radiated in all directions of upper hemisphere.

### 3.10 Battery Connection

All operating voltages are furnished by an integral battery pack. Operating voltage is 6.0 VDC. (Shipped without battery from factory)

Electrical connections between the main circuit board and the associated battery are accomplished by the use of clearly marked terminals and color-coded lead wires.

### 3.11 Buoyancy

The SM-2 is independently buoyant.

**A matter of balance**

**Marker lights need to float upright for maximum visibility. The 6 volt lantern batteries provide the ballast for these lights. Although these batteries are the same size, their different chemistries cause them to have varying weights. It is imperative that only the 6 volt battery models suggested are used. Too little ballast and the light will lie over on its side and be ineffective; too much weight and the light could sink. If you have any doubts that you are using a battery of appropriate weight, test the light by placing it into shallow water. The results will be obvious; if the light floats upright, it's good. If the light sinks, the battery is too heavy.**

### 3.12 Technical Data

Pertinent technical data is listed below:

| ITEM | CHARACTERISTICS |
|---|---|
| Dimensions | 13.65" (34.67 cm) length |
| | 4" (10.16 cm) diameter |
| Weight | 3 lbs, 4 oz. (1.474 Kg), including battery |
| | 1 lb, 13 oz. (.822 Kg), excluding battery |
| Modules (1) | Completely sealed electronics |
| Flashing Rate | 60 times per minute ± 1 |
| Flashing Light Intensity | Minimum of 2 candelas per flash in all directions of upper hemisphere |
| Power Requirement | Standard 6.0 volt lantern battery with screw terminals |
| Material | Plastic blend case, lexan lens |
| Activation | Automatic gravity switch |
| Bracket | Plastic blend mounting bracket |
| Recommended Battery Replacement Interval | 1 Year |
| Max battery weight | 1.49 lbs (675 grams) |



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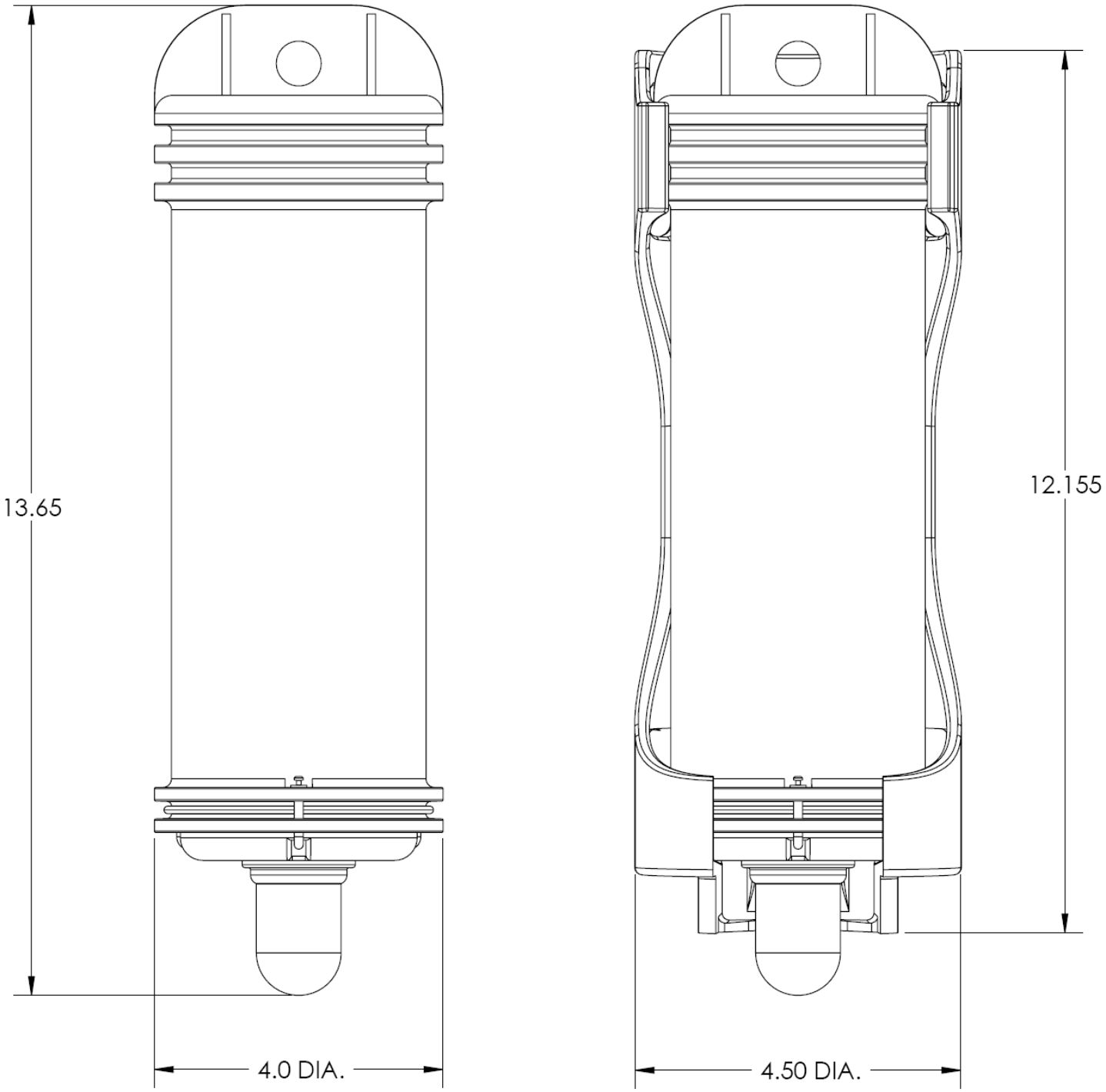


**FIGURE 2**
**OUTLINE AND DIMENSIONAL SKETCH**



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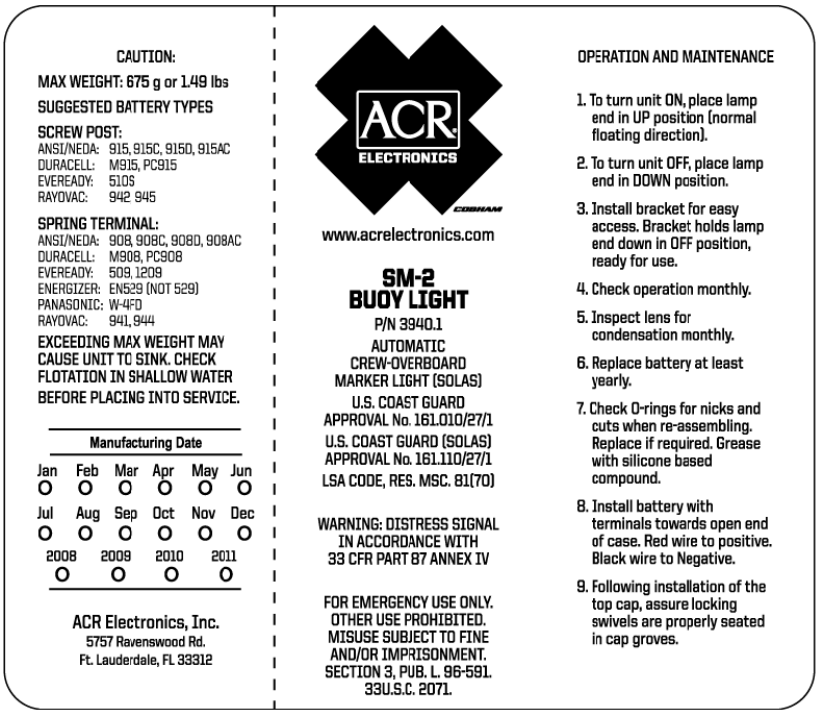
CAUTION:
MAX WEIGHT: 675 g or 1.49 lbs
SUGGESTED BATTERY TYPES
SCREW POST:
ANSI/NEDA: 915, 915C, 915D, 915AC
DURACELL: M915, PC915
EVEREADY: 510S
RAYOVAC: 942 945
SPRING TERMINAL:
ANSI/NEDA: 908, 908C, 908D, 908AC
DURACELL: M908, PC908
EVEREADY: 509, 1209
ENERGIZER: EN529 (NOT 529)
PANASONIC: W-4FD
RAYOVAC: 941, 944
EXCEEDING MAX WEIGHT MAY CAUSE UNIT TO SINK. CHECK FLOTATION IN SHALLOW WATER BEFORE PLACING INTO SERVICE.
Manufacturing Date
Jan Feb Mar Apr May Jun
Jul Aug Sep Oct Nov Dec
2008 2009 2010 2011
ACR Electronics, Inc.
5757 Ravenswood Rd.
Ft. Lauderdale, FL 33312
ACR ELECTRONICS
www.acrelectronics.com
SM-2
BUOY LIGHT
P/N 3940.1
AUTOMATIC
CREW-OVERBOARD
MARKER LIGHT (SOLAS)
U.S. COAST GUARD
APPROVAL No. 161.010/27/1
U.S. COAST GUARD (SOLAS)
APPROVAL No. 161.110/27/1
LSA CODE, RES. MSC. 81(70)
WARNING: DISTRESS SIGNAL IN ACCORDANCE WITH 33 CFR PART 87 ANNEX IV
FOR EMERGENCY USE ONLY. OTHER USE PROHIBITED. MISUSE SUBJECT TO FINE AND/OR IMPRISONMENT. SECTION 3, PUB. L. 96-591. 33U.S.C. 2071.
OPERATION AND MAINTENANCE
1. To turn unit ON, place lamp end in UP position (normal floating direction).
2. To turn unit OFF, place lamp end in DOWN position.
3. Install bracket for easy access. Bracket holds lamp end down in OFF position, ready for use.
4. Check operation monthly.
5. Inspect lens for condensation monthly.
6. Replace battery at least yearly.
7. Check O-rings for nicks and cuts when re-assembling. Replace if required. Grease with silicone based compound.
8. Install battery with terminals towards open end of case. Red wire to positive. Black wire to Negative.
9. Following installation of the top cap, assure locking swivels are properly seated in cap groves.

**FIGURE 3**
**INSTRUCTION PLATE LABEL**



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